



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

MACHINE LEARNING								
<b>VII Semester: CSE(CS)</b>								
Course Code	Category	Hours/Week			Credits	Maximum Marks		
AITC27	Elective	L	T	P	C	CIA	SEE	Total
		3	0	0	3	30	70	100
<b>Contact Classes:45</b>		<b>Tutorial Classes: Nil</b>		<b>Practical Classes: Nil</b>		<b>Total Classes:45</b>		
<b>Prerequisite: Linear Algebra and Calculus</b>								
<b>I. COURSE OVERVIEW:</b>								
<p>Machine learning (ML) is the study of computer algorithms that improve automatically through experience and by the use of data. ... Machine learning algorithms build a model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so. Machine learning is a field of study that looks at using computational algorithms to turn empirical data into usable models. The machine learning field grew out of traditional statistics and artificial intelligences communities.</p>								
<b>II. COURSE OBJECTIVES:</b>								
<b>The students will try to learn:</b>								
<ol style="list-style-type: none"> <li>I. The concepts of machine learning and related algorithms.</li> <li>II. The dimensionality problems using linear discriminates.</li> <li>III. The various statistical models for analyzing the data.</li> <li>IV. The clustering algorithms for unlabeled data.</li> </ol>								
<b>III. COURSE SYLLABUS:</b>								
<b>MODULE-I: TYPES OF MACHINE LEARNING (09)</b>								
<p>Concept learning: Introduction, version spaces and the candidate elimination algorithm; Learning with trees: Constructing decision trees, CART, classification example.</p>								
<b>MODULE-II: ARTIFICIAL NEURAL NETWORKS (09)</b>								
<p>Introduction, neural network representations, Appropriate problems for neural network learning, perceptions Multi-layer networks and the Back propagation algorithms, An illustrative example: Face recognition, advanced topics in Artificial neural networks.</p>								
<b>MODULE- III: BAYESIAN LEARNING (09)</b>								
<p>Averages, variance and covariance, the Gaussian; The bias-variance tradeoff, Bayesian learning: Introduction, Bayes theorem, Bayes optimal classifier, naïve Bayes classifier, Gibbs algorithm, Bayesian belief networks.</p>								
<p>The EM algorithm Computational learning theory: Introduction, probably learning an approximately correctly hypothesis sample complexity for finite hypothesis spaces, sample complexity for infinite hypothesis spaces, the mistake bound model of learning</p>								
<b>MODULE- IV: INSTANCE BASED LEARNING (09)</b>								
<p>Introduction, k-nearest neighbor algorithm, locally weighted regression, Radial basis functions case-based learning, remarks on lazy and eager learning. Genetic Algorithms, genetic operators; Genetic</p>								

programming.

#### **MODULE- V: INDUCTIVE AND REINFORCEMENT LEARNING (09)**

Motivation, Inductive analytical approaches to learning, using prior knowledge to alter the search objective. Introduction, The learning Task. Q Learning, On deterministic Rewards and Actions, Temporal Difference programming, Generating from examples, relationship to dynamic programming

#### **IV. TEXT BOOKS:**

1. Tom M. Mitchell, "Machine Learning ", McGraw Hill, 1<sup>st</sup> Edition, 2013.
2. Stephen Marsland, "Machine Learning- An Algorithmic Perspective ", CRC Press, 1<sup>st</sup> Edition, 2009.

#### **V. REFERENCE BOOKS:**

1. Margaret H Dunham, "Data Mining", Pearson Edition, 2<sup>nd</sup> Edition, 2006.
2. Galit Shmueli, Nitin Rel, Peter C Bruce, "Data Mining for Business Intelligence", John Wiley and Sons, 2<sup>nd</sup> Edition, 2007.
3. Rajjal Shinghal, "Pattern Recognition and Machine Learning", Springer-Verlag, New York, 1<sup>st</sup> Edition, 2006.

#### **VI. WEB REFERENCES:**

1. <https://www.oracle.com/in/cloud/application-development>
2. [http://computingcareers.acm.org/?page\\_id=12](http://computingcareers.acm.org/?page_id=12)
3. <http://en.wikibooks.org/wiki/cloudapplication>

#### **VII. E-TEXT BOOKS:**

1. [http://www.acadmix.com/eBooks\\_Download](http://www.acadmix.com/eBooks_Download)